

CRETACEOUS FAUNAS FROM ZULULAND AND NATAL,
SOUTH AFRICA

A NEW GENUS AND SPECIES OF TUBERCULATE
DESMOCERATAEAN AMMONITE FROM THE
MZINENE FORMATION (ALBIAN)

By

WILLIAM JAMES KENNEDY,

CLAUDE WILLIAM WRIGHT

Geological Collections, University Museum, Oxford

&

HERBERT CHRISTIAN KLINGER

South African Museum, Cape Town

(With 4 figures)

[MS. accepted 4 January 1979]

ABSTRACT

The low Middle Albian Mzinene Formation in its type area yields numerous specimens of *Umsinenoceras linguatuberculatum* gen. et sp. nov., previously identified as *Neosilesites* (Kennedy & Klinger, 1975) but probably a member of the Puzosiinae. It is closely related to *Feruglioceras* Leanza, 1967, and resembles various Marshallitinae (Kossmaticeratidae).

CONTENTS

	PAGE
Introduction	29
Systematic description	30
Discussion	35
Acknowledgements	37
References	37

INTRODUCTION

In a preliminary account of the stratigraphy and ammonite faunas of the Zululand Cretaceous, Kennedy & Klinger (1975) recorded in provisional lists from their division III of the Albian the genus '*Neosilesites*', associated with a diverse fauna indicating a low Middle Albian horizon. As a result of further collecting of well-preserved specimens, this material has been found to represent not a silesitid, but a new genus of Puzosiinae, allied to *Feruglioceras* Leanza, 1967, and an approximate homoeomorph of various Kossmaticeratids. The species is described below as *Umsinenoceras linguatuberculatum* gen. et sp. nov.

SYSTEMATIC DESCRIPTION

Superfamily DESMOCERATACEAE Zittel, 1895

Family **Desmoceratidae** Zittel, 1895

Subfamily Puzosiinae Spath, 1922

Genus *Umsinenoceras* nov.*Type species*

Umsinenoceras linguatuberculatum gen. et sp. nov., low Middle Albian, Zululand.

Derivation of name

Named after the Mzinene River, alternatively spelt Umsinene.

Diagnosis

Small, compressed, relatively evolute, with dense, fine, flexuous prorsiradiate ribs which may split across the ventrolateral shoulder. Venter flattened with fine striae only during middle growth stages. Constrictions frequent in middle and later growth, parallel with the ribs, prorsiradiate, interrupted over the siphuncle on internal moulds. Ventrolateral clavi irregularly developed in middle and later growth. Slight, sharp umbilical bullae sometimes present. Suture deeply incised, with bifid saddles, asymmetrically trifid L and retracted U.

Occurrence

Low Middle Albian of Zululand.

Umsinenoceras linguatuberculatum sp. nov.

Figs 1-4

Holotype

BMNH C81275, from the Mzinene Formation, Albian III, locality 35, cliff and stream sections extending over several hundred metres along the Mzinene approximately, 1 200 m NE of the farm Amatis, north of Hluhluwe, Zululand, 27°58'03"S 32°18'31"E. In the collections of the British Museum (Natural History).

Paratypes

BMNH C81276-81298 and SAS A1363, A1372, A1413-4, from the same horizon and locality, housed in the collections of the British Museum (Natural History), and the Geological Survey (Pretoria).

Derivation of name

Latin *lingua-*, tongue, and *tuberculatus -um*, tuberculate, in reference to the linguiform line of ribs and constrictions, combined with tubercles, on the venter.

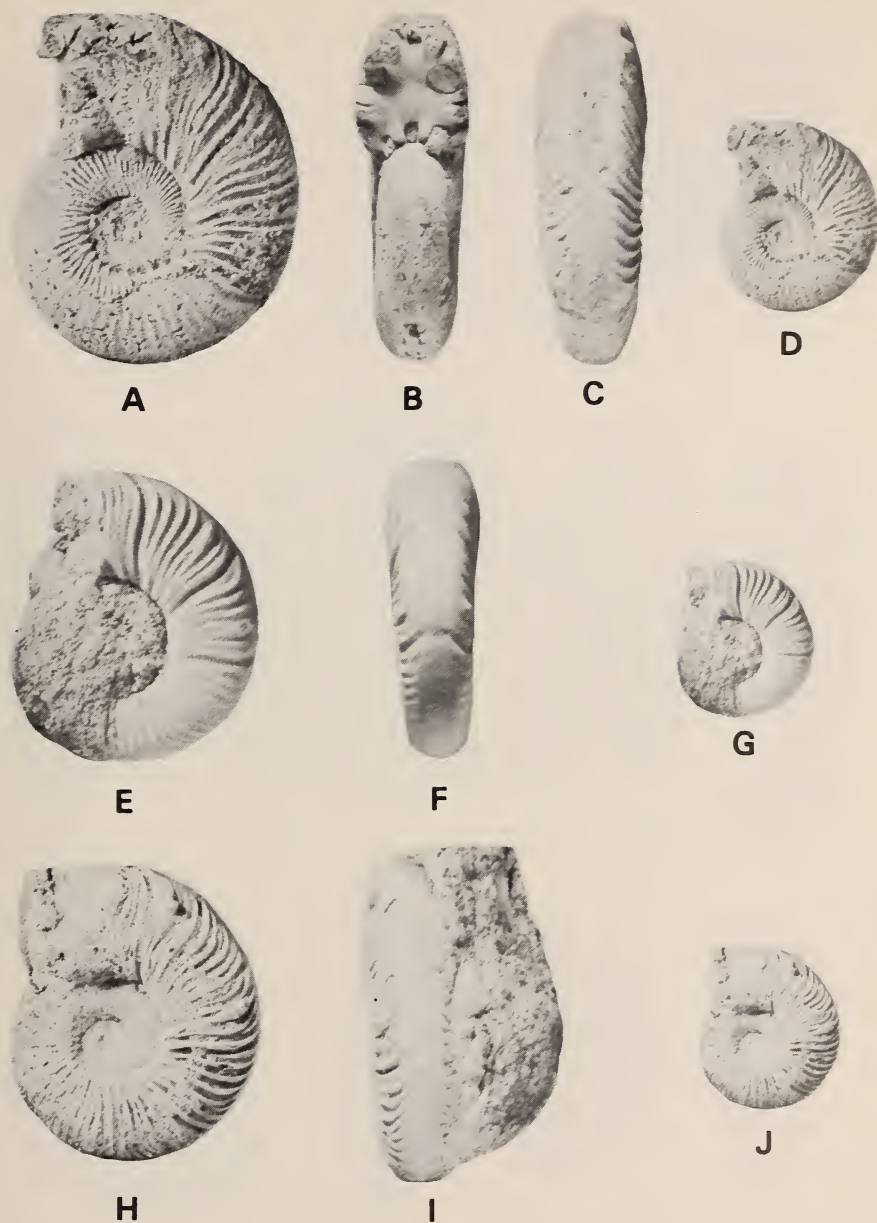


Fig. 1. *Umsinenoceras linguatuberculatum* gen. et sp. nov. A-D. Holotype BMNH C81275. E-G. Paratype C81283. H-J. Paratype C81282. A-C, E-F, H-I $\times 2$; D, G, J $\times 1$.

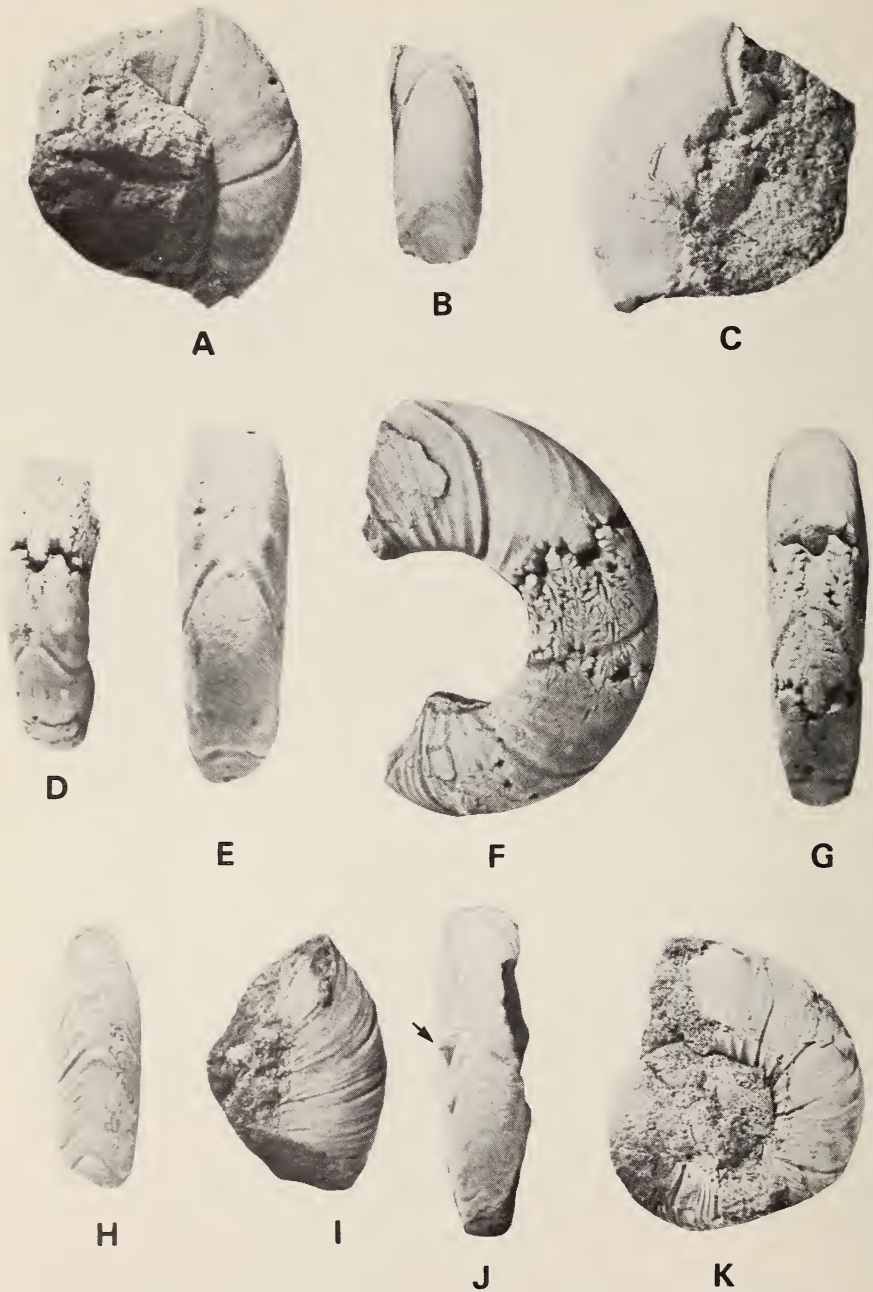


Fig. 2. *Umsinenoceras linguatuberculatum* gen. et sp. nov. A-C. Paratype BMNH C81279, a body chamber. D-G. Paratype BMNH 281277, adult phragmocone with part of body chamber. H-I. Paratype BMNH C81276, with preserved aperture. J-K. Paratype BMNH C81278, preserving shell and septate tubercle (arrowed).



Fig. 3. *Umsinenoceras linguatuberculatum* gen. et sp. nov. A-B, D. Paratype BMNH C81285. C. Paratype BMNH C81287. E-H. Paratype BMNH C81281. I-K. Paratype BMNH C81284. L-M. Paratype BMNH C81288. A-C, E-G, I-J, L-M $\times 2$; D, H, K $\times 1$.

Dimensions

All dimensions are in millimetres. D = diameter, Wb = whorl breadth, Wh = whorl height, U = umbilical diameter.

Figures in parentheses are dimensions expressed as percentages of the total diameter.

	D	Wb	Wh	Wb:Wh	U
BMNH C81277	46,5 (100)	11,2 (24)	16,8 (36)	0,67	18,6 (40)
Holotype					
BMNH C81275	26,4 (100)	8,0 (30)	9,3 (35)	0,86	9,2 (35)
BMNH C81280	24,8 (100)	7,2 (29)	8,4 (34)	0,86	8,5 (34)
BMNH C81281	22,2 (100)	7,2 (32)	7,4 (33)	0,97	8,3 (37)
BMNH C81285	20,0 (100)	6,3 (32)	6,4 (32)	0,98	7,8 (39)

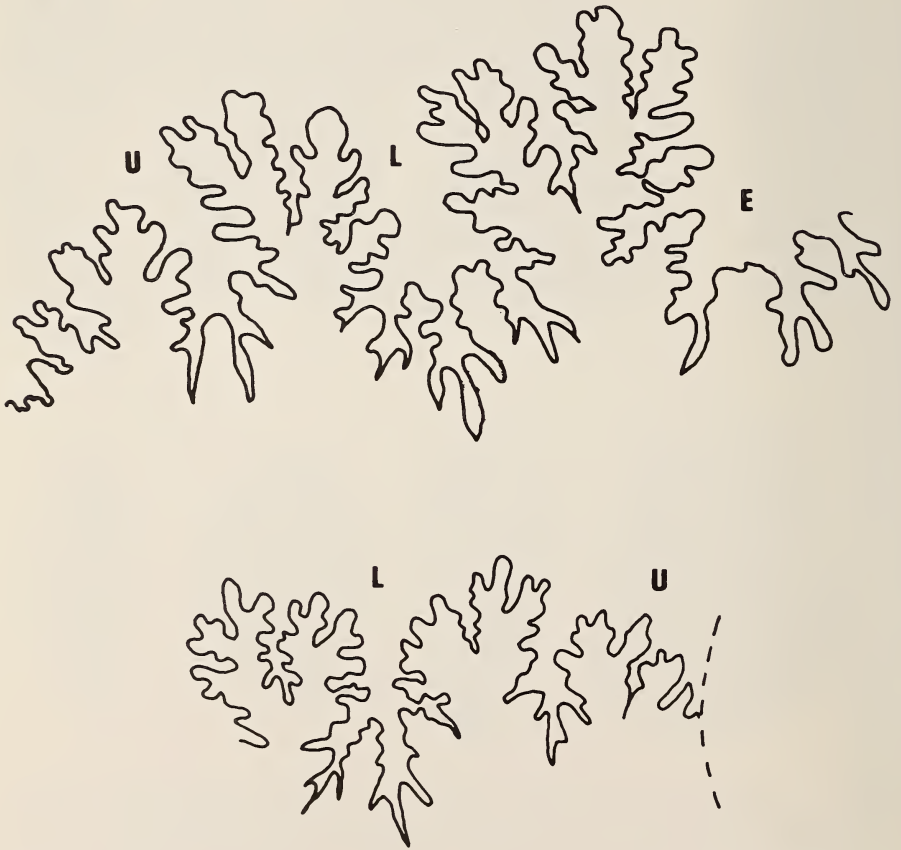


Fig. 4. *Umsinenoceras linguatuberculatum* gen. et sp. nov. A. External suture of paratype BMNH C81277. B. Paratype C81280. Both $\times 6$.

Description

The earliest stages of development are revealed by BMNH C81288; these show the coiling to be relatively involute up to a diameter of 6 mm, with a shallow umbilicus, a low, rounded umbilical wall and a broadly rounded whorl section. Internal moulds appear smooth but the shell, where preserved, bears fine, dense, flexuous ribs. By a diameter of 10 mm the coiling is more evolute. The umbilicus now comprises 25 per cent of the diameter and is shallow, with a low, rounded wall. The whorl section is slightly depressed with an abruptly rounded umbilical shoulder, flattened inner flanks, convergent outer flanks, an abruptly and narrowly rounded ventrolateral shoulder and a flattened venter. Ornament consists of fine, dense, prorsiradiate ribs, typically 60–70 per whorl; these arise at the umbilical seam, strengthen across the wall and in some cases bifurcate at the umbilical shoulder. They sweep forwards across the inner flank, and are feebly convex, sweeping backwards across the mid-flank. The ribs either split in pairs, or a short intercalated rib appears on the outer third of the flanks, where all ribs are concave, sweeping forwards across the shoulders. The ribs disappear on the flattened venter, where the shell bears only faint delicate striae, projected in a tongue-like extension. The ribs are strong and wire-like on the shell but the ornament of the internal moulds is very feeble.

Constrictions first appear at a diameter of 13 to 16 mm. On the shell these are deep, narrow, flexuous and prorsiradiate and are both followed and preceded by a strengthened rib. On the mould the constrictions are broader and pass across the venter with little diminution in depth, being projected parallel to the growth striae. The spacing of constrictions is variable; in BMNH C81280 there are six in a half whorl at a diameter of 24 mm; in BMNH C81284 the same number occupy a whole whorl.

As size increases, irregularly spaced ventrolateral nodes appear. On moulds they are blunt and clavate; where shell is present (e.g. BMNH C81278) it is clear that the node represents the base only of a tiny septate, finger-like, rounded-topped horn. These clavi commonly develop on a thickened rib or two or three of the long ribs may link with them.

Three specimens, BMNH C81276–8, show the compressed, flat-sided adult body chamber. Here the ribs and striae are irregularly developed, prorsiradiate and strongly concave rather than flexuous, the venter becomes somewhat rounded, and is crossed by occasional ribs and constrictions which project forwards in a long, narrow tongue.

The suture line (Fig. 4) is deeply incised, with a large, asymmetrically bifid E/L, deep L asymmetrically trifid, LU₂ asymmetrically bifid, and U distinctly retracted.

DISCUSSION

There are some similarities between *Umsinenoceras* and late members of the Silesitidae such as *Neosilesites* Breistroffer and *Parasilesites* Imlay. However, like all silesitids, these have a simpler, less incised suture with projected, not

retracted umbilical elements, and lack ventral tubercles. The Barremian *Silesites* itself has oval whorls and ribs which cross the venter. Moreover, in all Silesitidae the ribs branch, if at all, high up the sides, not from the umbilical tubercle.

Feruglioceras Leanza, 1967, type species *F. piatnitzkyi* Leanza, from the *Sanmartinoceras patagonicum* Zone (probably Upper Aptian (see Leanza 1970: 258; Thomson 1974: 43)) of the Lago San Martin Formation of Patagonia, seem to be the closest described genus to *Umsinenoceras*. (Note: In 1967 Leanza (1967: 156) established *Feruglioceras* with *F. piatnitzkyi* sp. nov. as type and sole species. He differentiated his three specimens from *Pseudohaploceras* at the generic level and (1967: 157) at the specific level from '*Silesites*' *desmoceroides* Stolley (1912: 7) with which Bonarelli (1921: 22) and, following him, Feruglio (1936) and Piatnitzky (1938) had misidentified them. In the authors' view this satisfies Article 13(a)(i) of the *I.C.Z.N. Rules* in respect of the names *piatnitzkyi* and *Feruglioceras*.) It is characterized by its compressed subtabulate whorl section, frequent flexuous constrictions separated by extremely sharp, fine, irregularly branching ribs, fifteen or more between constrictions. *Feruglioceras* is probably derived from *Pseudohaploceras* by increase in closeness, fineness and flexuousness of ribs. In comparison, *Umsinenoceras* has lower and somewhat weaker ribs, becoming feebler and more distant on the body chamber, and developing prominent ventrolateral tubercles, but it resembles *Feruglioceras* closely in its subtabulate venter, degree of evolution, sinuous ribs branching in bundles from fine umbilical tubercles, and the frequent constrictions parallel to the ribs.

There are considerable similarities between *Umsinenoceras* and various members of the Kossmaticeratidae. This family is currently divided into subfamily Marshallitinae Matsumoto, 1955, ranging probably from the Upper Aptian (?*Hulenites* from Japan (see Obata 1967: 67; Matsumoto, Kanmera & Sakamoto 1968: 145)) to Cenomanian and perhaps Turonian (Matsumoto 1955, 1956), and subfamily Kossmaticeratinae, ranging from Upper Turonian to Maastrichtian. Marshallitinae apparently evolved from a compressed puzosiine form by increased compression, a tendency to flatten and lose ribs on the venter, and increasingly prorsiradiate constrictions. In the earliest form, *Hulenites* Matsumoto, 1955, the constrictions do not yet truncate the ribs behind them, as is characteristic of most Kossmaticeratidae.

Hulenites (Upper Aptian to Upper Albian) is more compressed and involute than *Umsinenoceras*, with a much smaller umbilicus. The ribbing is fairly similar as are the constrictions, but *Hulenites* does not have the smooth tabulate venter of the adult shell nor the ventrolateral tuberculation of *Umsinenoceras*. *Marshallites* Matsumoto, 1955, which ranges from Cenomanian to Lower Turonian, is still more high-whorled, compressed and involute, and the constrictions clearly truncate the ribs. It resembles *Umsinenoceras* in the fine umbilical tubercles, but the ribs are not weakened on the venter. *Holcodiscooides* Spath, 1922, from the Turonian of southern India, resembles *Umsinenoceras* in being evolute with flat sides and having ventrolateral tubercles, but it is much further removed

from the ancestral puzosiiforme type. It has almost square whorls with rectiradiate to slightly prorsiradiate, nearly straight ribs, and prorsiradiate constrictions, all crossing the venter nearly transversely.

Other members of the Marshallitinae, *Eomadrasites* Matsumoto, 1955, with irregular strong umbilical, ventrolateral and siphonal tubercles, *Eogunnarites* Wright & Matsumoto, 1954, with depressed whorl section and olcostephanoid ribbing, and *Mikasites* Matsumoto, 1956, with fine ribbing crossing the venter transversely and distinct siphonal tubercles, are all readily distinguished from *Umsinenoceras*.

In view of the resemblance between *Feruglioceras* and *Umsinenoceras* on the one hand, and *Hulenites* and *Marshallites* on the other, the question arises whether the former two genera should be placed in the Marshallitinae. The general shell form, ribbing and relatively simple suture with moderately retracted suspensive lobe would all fit in the Kossmaticeratidae, but there are distinct contrary indications. *Umsinenoceras* does not have the most characteristic feature of the Kossmaticeratidae, i.e. constrictions that truncate the ribs. Moreover, Marshallitinae do not have such strongly projected ventral ribbing as do *Feruglioceras* and *Umsinenoceras*. The sutures do not help in deciding. Those of *Marshallites* itself are much more incised and complex and, indeed, more puzosiiforme than those of *Umsinenoceras*, although later Kossmaticeratinae may have simpler sutures, like those of the new genus.

On balance, it appears to us that *Umsinenoceras* is closely related to *Feruglioceras*, and an offshoot of *Pseudohaploceras* or an allied Southern hemisphere genus that was independent of, though in some ways similar to, the Northern hemisphere *Hulenites* and *Marshallites* line. If this is so it would be misleading to place *Feruglioceras* and *Umsinenoceras* in the Marshallitinae, and it is in the authors' view better to retain them for the time being in the Puzosiinae.

ACKNOWLEDGEMENTS

We are grateful to Dr I. Hayami, Tokyo, Dr M. K. Howarth and Mr D. Phillips of the British Museum (Natural History), and the staff of the Geological Collections, University Museum, Oxford, and the South African Museum, Cape Town, for their help in many ways, and to Professor T. Matsumoto, Kyushu University, who commented on an earlier draft of the paper. The financial assistance of the Trustees of the Sir Henry Strakosch Bequest, the National Environmental Research Council, and Wolfson College, Oxford, are gratefully acknowledged.

REFERENCES

- BONARELLI, G. 1921. In: Bonarelli, G. & Nagéra, J. J. Observaciones geológicas en las inmediaciones del Lago San Martín (Territorio de Santa Cruz). *Boln Dir. gen. Minas Geol. Hidrol., B. Aires* (B) 27: 1-39.
- FERUGLIO, E. 1936. Palaeontographica Patagonica. Pt. 1. *Memorie Inst. geol. miner. Univ. Padova* 11: 1-381.

- KENNEDY, W. J. & KLINGER, H. C. 1975. Cretaceous faunas from Zululand and Natal, South Africa. Introduction, Stratigraphy. *Bull. Br. Mus. nat. Hist. (Geol.)* **25**: 263-315.
- LEANZA, A. F. 1967. Anotaciones sobre los fósiles jurásico-cretácicos de Patagonia austral (colección Feruglio) conservados en la Universidad de Bologna. *Act. geol. lilloana* **11**: 121-188.
- LEANZA, A. F. 1970. Ammonites nuevos o poco conocidos de Aptiano, Albiano y Cenomanino de los Andes australes con notas acerca de su posición estratigráfica. *Revta. Asoc. geol. argent.* **25**: 197-261.
- MATSUMOTO, T. 1955. Family Kossmaticeratidae from Hokkaido and Saghalien. *Jap. J. Geol. Geogr.* **26**: 115-165.
- MATSUMOTO, T. 1956. Further notes on the Kossmaticeratids from Hokkaido. *Jap. J. Geogr.* **27**: 173-187.
- MATSUMOTO, T., KANMERA, K. & SAKAMOTO, H. 1968. Notes on two Cretaceous Ammonites from the Tomochi Formation of Kyushu. *Jap. J. Geol. Geogr.* **39**: 139-148.
- OBATA, I. 1967. Lower Cretaceous Ammonites from the Miyako Group. *Trans. Proc. palaeont. Soc. Japan* (n.s.) **66**: 63-72.
- PIATNITZKY, A. 1938. Observaciones geológicas en el Oeste de Santa Cruz (Patagonia). *Boln. Ints. petrol.* **165**: 45-85.
- THOMSON, M. R. A. 1974. Ammonite faunas of the Lower Cretaceous of south-eastern Alexander Island. *Br. Antarct. Surv. Sci. Rep.* **80**: 1-44.
- SPATH, L. F. 1922. On the Senonian ammonite fauna of Pondoland. *Trans. R. Soc. S. Afr.* **10**: 113-147.
- STOLLEY, E. 1912. Ueber einige Cephalopoden aus der Unteren Kreide Patagoniens. *Arkiv. Zool.* **7**: 13-18.
- ZITTEL, K. A. VON. 1895. *Grundzüge der Palaeontologie*. Munich & Leipzig.
- WRIGHT, C. W. & MATSUMOTO, T. 1954. Some doubtful ammonite genera from Japan and Saghalien. *Mem. Fac. Sci. Kyushu Univ. (D)* **5**: 107-134.